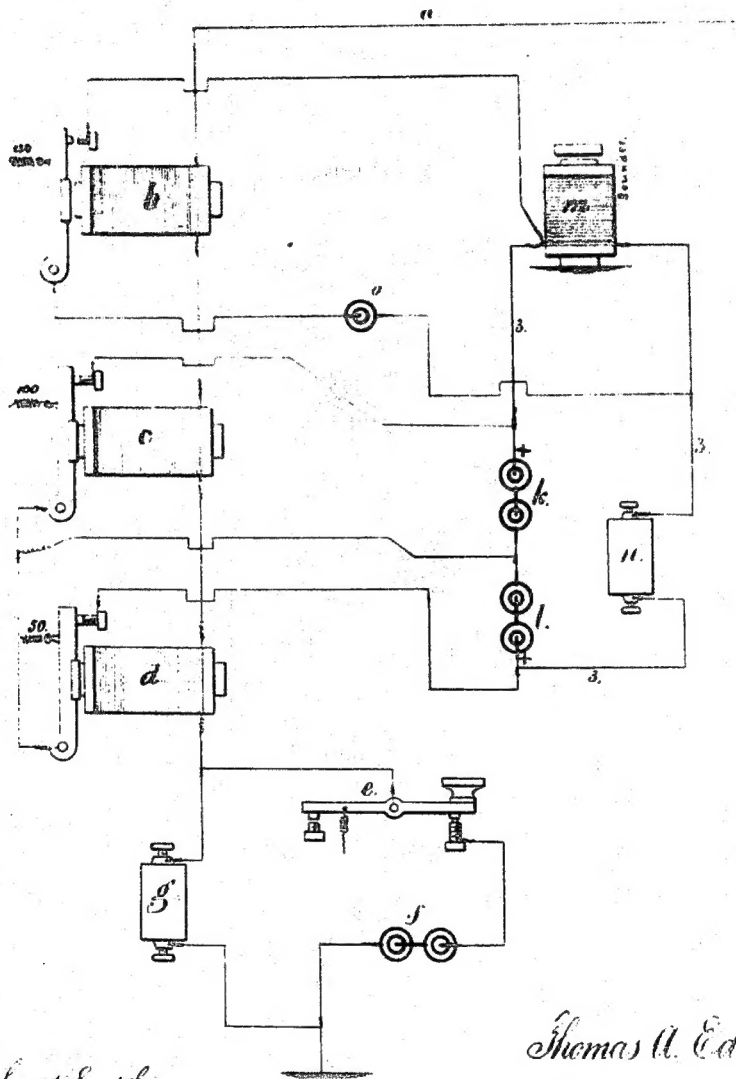


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T. A. EDISON.
Duplex-Telegraphs.

No. 147,917.

Patented Feb. 24, 1874.



Witness

Chas. H. Smith
Harold L. Smith

Inventor

Thomas A. Edison
per *L. W. Serrell*

Atty.

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UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF NEWARK, NEW JERSEY.

IMPROVEMENT IN DUPLEX TELEGRAPHS.

Specification forming part of Letters Patent No. 117,917, dated February 24, 1874; application filed June 27, 1873.

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Newark, in the county of Essex and State of New Jersey, have invented Improvements in Circuits for Duplex Electric Telegraphs, of which the following is a specification:

This invention is for enabling the operators at both stations to receive simultaneously, and that without the receiving-instrument being affected by the signals transmitted from the same station. I accomplish these objects by arranging the batteries, circuits, and magnets so that the receiving portion of the instrument will only respond to the pulsations from the distant instrument.

In the accompanying diagram, the line *a* is connected, through the electro-magnets *b c d*, to the key *e*, and the battery *f* is divided, half being at each station, as usual. *g* is a rheostat, to prevent the current being short-circuited, but always to maintain a connection of the line to the earth, even when the key *e* may be open. The batteries *k* and *l* are of equal power, and are connected in the circuit 3 in opposition to each other, and in that circuit is the sounder *m*, or other indicating-instrument or call. The battery *k* is connected with the armature circuit-closer operated by the magnet *c*, and the battery *l* with the armature circuit-closer of the magnet *d*. In the circuit 3 is a rheostat, *n*, of sufficient resistance to insure the electricity from the battery *o* passing through the sounder *m* when the circuit-closer of *b* is operated. The instruments at both ends of the line are the same and the adjustments correspond.

The armatures of *b c d* are adjusted to different tensions. Suppose, as an illustration, that the magnet *d* is operated by an electric energy of 50, the magnet *c* by an energy of 100, and the magnet *b* by an energy of 150, and that

the power of the battery *f* is 100, but the signal received from one station at the other is only represented by 50. If, now, the operator closes key *e*, both the magnets *d* and *c*, by the power of *f*, respond, and make and break the circuits to the batteries *l* and *k*, and there is no action on the sounder *m* or the magnet *b*. If the operator at the distant station closes his key when the key *e* is closed, the electric tension is increased by the increased energy represented by 50; hence the magnet *b* responds by the joint current from both ends, and operates the sounder *m* by the battery *o*; but if the key *e* is open, the magnet *d* responds to the pulsation from the distant station and short-circuits the battery *l*, allowing the battery *k* to be unbalanced and to operate the sounder *m*. Thus the signal can be received from the distant station whether the key *e* is open or closed, and the operator can also hear the click of his own magnets *c d* without actuating the sounder *m*.

By this arrangement the operators at both ends of the line can be receiving and sending over one wire, and the sounder or receiving-instrument is only operative from the distant station, and it is operative as well when the key *e* is open as when it is closed, and vice versa.

I claim as my invention—

The batteries *k l o* and circuits and circuit-closers of the electro-magnets *b c d*, in combination with the electro-magnetic sounder or call *m* and key *e*, the parts being adjusted to operate substantially in the manner specified.

Signed by me this 23d day of April, A. D. 1873.

THOS. A. EDISON.

Witnesses:

GEO. T. PINCKNEY,
CHAS. H. SMITH.